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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/591,946	11/30/2006	Stephan Oberle	27634U	6433
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EXAMINER YABUT, DANIEL D				
ART UNIT		PAPER NUMBER		
3656				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/591,946

**Applicant(s)**

OBERLE ET AL.

**Examiner**

DANIEL YABUT

**Art Unit**

3656

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 04 November 2011.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 5) ☒ Claim(s) 1-19 is/are pending in the application.
- 5a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 6) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 7) ☒ Claim(s) 1-19 is/are rejected.
- 8) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 9) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-893)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_
- Paper No(s)/Mail Date 11/4/2011 and 9/28/2011

## DETAILED ACTION

### Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5, 9, 12-14, 16, 17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chun (KR20020046534) in view of Ishikawa (US Patent 4,031,770).

KR20020046534 discloses an engine auxiliary drive (see Fig. 1) comprising a(n):

Re claim 1

- First (5) toothed gear wheel made of plastic (English abstract, ll. 6-9)
- Second gear wheel (4) with tooth flanks (at 5 and 4, respectively) meshing with each other (abstract, ll. 7-9)

Chun does not expressly disclose that the tooth flanks of said toothed gear wheels comprise an involute-free mesh profile in the force transmission area, and transition from a concave area directly to a convex area, effective profiles of said tooth flanks matching in a manner that the meshing of the tooth flanks occurs at planiform contact regions, linearly viewed in their cross section, along their complete height.

Ishikawa teaches tooth flanks (Fig. 2) comprising an involute-free mesh profile in the force transmission area (col. 1, ll. 54-63), and transition from a concave area (4) directly to a convex area (3), effective profiles of said tooth flanks matching in a manner that the meshing of the tooth flanks occurs at planiform contact regions (a3-a4; Fig. 4), linearly viewed in their cross

section, along their complete height (col. 3, ll. 16-22) for the purpose reducing the stiffness of teeth under bending stress, hence effectively reducing unwanted vibration and noise during operation (col. 4, ll. 10-19).

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the tooth flanks of said toothed gear wheels of Chun to comprise an involute-free mesh profile in the force transmission area, and transition from a concave area directly to a convex area, effective profiles of said tooth flanks matching in a manner that the meshing of the tooth flanks occurs at planiform contact regions, linearly viewed in their cross section, along their complete height, as taught by Ishikawa, for the purpose of reducing the stiffness of teeth under bending stress, hence effectively reducing unwanted vibration and noise during operation.

Chun as modified above further comprises the following:

Re claim 1 (cont'd)

- Effective profiles of the tooth flanks coordinated with each other over their entire height (col. 3, ll. 16-22 in Ishikawa) thereby establishing said planiform contact regions (a3-a4; Fig. 2 in Ishikawa), linearly viewed in cross section, along their complete height

Re claim 2

- Second gear wheel (5) is made of a material with greater strength than the first gear wheel (4), the second gear wheel (5) being metal (abstract, ll. 6-9)

Re claim 3

- At least sections opposing tooth flanks of gear wheel having nearly the same curvature in their tooth flanks (col. 3, ll. 3-5; Ishikawa)

Re claim 4

- Concave area (4; Ishikawa) being situated in an area adjoining a tooth base (col. 3, ll. 7-8; Ishikawa)
- Convex area (3; Ishikawa) being situated in an area of the respective teeth adjoining a tooth crest (col. 3, ll. 6-7; Ishikawa)

Re claim 5

- Second gear wheel (5) is made of a material with greater strength than the first gear wheel (4), the second gear wheel (5) being metal (abstract, ll. 6-9).

Re claim 9

- During rolling off of the gear wheels there are always two or more teeth of the gear wheels meshed with each other (col. 1, ll. 54-65; col. 3, ll. 16-22; Ishikawa)

Re claim 12

- Engine auxiliary drive driving one or more balancing shafts (abstract, ll. 1-3)

Re claim 13

- First and second gear wheels are designed as helical-toothed spur gears (see helical teeth at 5 and 4 in Chun, respectively)

Regarding claim 14, Chun does not expressly disclose the first and second gear wheels are designed as straight-toothed spur gears.

Ishikawa teaches the use of straight-toothed spur gears (col. 1, ll. 29-45, ll. 54-65; Fig. 5) for the purpose of promoting the configuration wherein two teeth are held in meshing contact at all times (col. 1, ll. 29-35).

It would have been obvious to one having ordinary skill in the art at the time of the invention to alternatively provide the first and second gear wheels designed as straight-toothed spur gears, as taught by Ishikawa, in Chun as modified above for the purpose of promoting the configuration wherein two teeth are held in meshing contact at all times.

Chun as modified above further discloses the following:

Re claim 16

- First (5) toothed gear wheel made of plastic (English abstract, ll. 6-9).
- Second gear wheel (4) with tooth flanks meshing with each other (abstract, ll. 7-9).
- Tooth flanks of said toothed gear wheels having an involute-free mesh profile in the force transmission area (col. 1, ll. 54-63; Ishikawa)
- Transition from a concave area (4; Ishikawa) directly to a convex area (3; Ishikawa)
- Effective profiles of said tooth flanks matching in a manner that it comes to planiform contact regions (a3-a4; Ishikawa), linearly vied in cross section, along their complete height, wherein the effective profiles of the tooth flanks continuously mesh over the tooth flanks' entire surface (a3-a4; col. 10-15; Ishikawa)
- Transition from the concave area (4; Ishikawa) directly to the convex area (3; Ishikawa) provides a direct change from a concave to a convex curve in transition zones with no involute transition area (col. 1, ll. 54-63; Ishikawa), thereby reducing development of noise during meshing (col. 4, ll. 14-19; Ishikawa), and achieving a

high bearing and loading capability over an entire rolling contact zone resulting from the meshing of teeth (col. 4, ll. 10-16; Ishikawa)

Re claim 17

- Second gear wheel (5) is made of a material with greater strength than the first gear wheel (4), the second gear wheel (5) being metal (abstract / L6-9)

Re claim 19

- During rolling off of the gear wheels there are always two or more teeth of the gear wheels meshed with each other (col. 1, ll. 54-65; col. 3, ll. 16-22; Ishikawa)

Claims 6-8 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chun (KR20020046534) in view of Ishikawa (US Patent 4,031,770) as applied to claims 1, 5 and 16 above, and further in view of Pickles, US Patent 2,760,381.

Regarding claims 6-8, Chun discloses all the claim limitations, see above, but does not expressly disclose the tooth thickness of the teeth of the gear wheel made of metal being less than the thickness of the teeth of the plastic gear wheel, the gear wheel made of plastic having a greater tooth width or tooth thickness on the pitch circle of the gear wheel than the space width between adjacent teeth, and the gear wheel made of metal having a smaller tooth width or tooth thickness on the pitch circle of the gear wheel than the space width between adjacent teeth.

Pickles teaches the use of a tooth thickness (T2) of the teeth (14) of a gear wheel (11) made of metal (col. 2, ll. 51-53) being less than the thickness (T1) of the teeth of the plastic gear wheel (12; col. 2, ll. 59-65), where the wheel made of plastic (12) has a greater tooth thickness on the pitch circle of the gear wheel than the space width between adjacent teeth and the wheel made of metal (11) has a smaller tooth thickness on the pitch circle of the gear wheel than the

space width between adjacent teeth (col. 2, ll. 30-36) for the purpose of increasing the strength of the plastic gear while not adding unnecessary material to the metal gear wheel (col. 1, ll. 60-65) thus providing a mechanism with lighter weight.

It would have been obvious to one having ordinary skill at the time of the invention to provide a tooth thickness of the teeth of a gear wheel made of metal being less than the thickness of the teeth of the plastic gear wheel, where the wheel made of plastic has a greater tooth thickness on the pitch circle of the gear wheel than the space width and the wheel made of metal has a smaller tooth thickness on the pitch circle of the gear wheel than the space width, as taught by Pickles, in the device of Chun as modified above for the purpose of increasing the strength of the plastic gear while not adding unnecessary material to the metal gear wheel thus providing a lighter mechanism with lighter weight.

Chun as modified above further discloses the following:

Re claim 18

- Second gear wheel is made of metal (abstract, ll. 6-9)
- Tooth thickness of the teeth of the gear wheel made of metal is less than a thickness of the teeth of the gear wheel made of plastic (C2 / L59-65; Pickles)
- Gear wheel made of plastic has a greater tooth width or tooth thickness on the pitch circle of the gear wheel than a space width between adjacent teeth (col. 2 ll. 30-36).

Claims 10, 11 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chun (KR20020046534) in view of Ishikawa (US Patent 4,031,770) as applied to claim 1 above, and further in view of Hiroi et al. (PG Pub 2002/0051860; Hiroi hereinafter).



Regarding claim 10, Chun as modified above discloses all the claim limitations but does not expressly disclose the plastic gear wheel being an injection molded part that receives no additional treatment after the injection molding.

Hiroi et al. teaches the use of a plastic gear wheel (11; Fig. 3) being an injection molded part (§ [0030], ll. 4-6) receiving no additional treatment after the injection molding (§ [0015], ll. 1-5) for the purpose of reducing manufacturing costs that would otherwise be expensed by further treatments.

It would have been obvious to one having ordinary skill at the time of the invention to alternatively provide a plastic gear wheel being an injection molded part that receives no additional treatment after the injection molding, as taught by Hiroi et al., in the device of KR20020046534 as modified above for the purpose of reducing manufacturing costs that would otherwise be expensed by further treatments.

Chun as modified above further discloses the following:

Re claim 11

- The gear wheel made of plastic is injection molded onto a hub or a part of a shaft having raised parts (15; Hiroi et al.) and/or depressions on its outer circumference.

Re claim 15

- The plastic for the first gear wheel is a homogeneous plastic (§ [0011] lines 1-3);

Note: Regarding claims 10 and 11, the MPEP states, “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from

a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See MPEP 2113.

### **Response to Arguments**

Applicant's arguments filed 11/4/2011 have been fully considered but they are not persuasive.

Applicant argues that Ishikawa fails to teach planiform contact regions. In response, the broadest reasonable interpretation of the claim limitation “planiform contact regions” necessarily encompasses line contact. Specifically, Applicant asserts that a point is a zero-dimensional concept that has no volume, area, or length. In practice, a point or line contact between two physical objects would inherently occupy some value of area. The notion of surface contact between two elements characterized as effectively having no physical dimensions would serve to undermine the very existence of said surface contact. As such, Applicant's argument is deemed unpersuasive.

### **Conclusion**

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL YABUT whose telephone number is (571)270-5526. The examiner can normally be reached on Monday through Friday from 9:00 A.M. to 5:00 P.M. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard W. Ridley can be reached on (571)272-6917. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/DANIEL YABUT/

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1/21/2012

/Richard WL Ridley/

Supervisory Patent Examiner, Art Unit 3656